ICT as a Teaching and Learning Tool - Annotated Bibliography

Article 1:

Dias, L. B., & Atkinson, S. (2001). *Technology integration: Best practices – where do
     teachers stand?* International Electronic Journal For Leadership in Learning, 5(10).
     Retrieved April 18, 2003 from http://www.ucalgary.ca/~iejll/volume5/dias.html

According to Dias & Atkinson (2001), the process teachers experience as they move from novice technology user to expert technology user is transformational by involving changes in teacher perspectives, assumptions, and behaviours. An evolution process, which consists of the five stages of technology integration, is discussed:

- Stage 1 – **Entry Phase** – text-based materials, teachers in 'survival mode,' computers at the back of the classroom used for rewards or free time, teachers overwhelmed by technology

- Stage 2 – **Adoption Phase** – beginning interest towards technology integration, students taught how to use technology (keyboarding, word processing), teachers able to troubleshoot basic technological problems

- Stage 3 – **Adaptation Phase** – teachers focus on organizing and planning student technology activities, students increase their understanding and use of computer skills, teachers use computers as a time saver, teachers plan for technology integration

- Stage 4 – **Appropriation Phase** – teachers have positive attitude towards technology and understand its importance and usefulness, teachers implement computers to support curriculum objectives

- Stage 5 – **Invention Phase** – teachers have technology integration repertoire, students working collaboratively and as experts

 A study was conducted to discover what 'best practices' you might expect to see from teachers towards technology integration. Dias & Atkinson (2001) discuss five of the most common technology integration practices found.

1. **Multidisciplinary Units and Situated Learning** - Teaching units are created to "bridge the gap between inert knowledge and knowledge application" (Dias & Atkinson, 2001, 25). These units integrate technology to assist students in acquiring the technological knowledge, skills, and tools needed for real life situations.

2. **Objectives Drive Technology Use and Flexible Instructional Roles** - This 'best practice' found educators focusing on curriculum objectives first and then deciding on *when, if*, and *where* to use technology. All technology-integrating teachers in this study realized the different roles technology could play within curriculum goals or lessons.

3. **Collaboration and a Community of Learners** - Here, technology integrators utilize each student's strengths by developing teamwork skills and scaffolding learning. Using computers for

cooperative learning and instruction has tremendous benefits while incorporating e-mail and the Internet extends the community of learners beyond the four classroom walls.

4. **Scaffolding for Understanding** - Educators provide learners with assistance to complete a task until eventually the student is able to work independently. Scaffolding strategies such as bookmarking, graphic organizers, and multimedia 'mindtools' can be used.

5. **Using Multiple Hard and Soft Technologies** - This best practice represents the incorporation of multiple uses of technology. Integrating soft techniques such as word processing or databases along with hard technologies such as digital cameras and scanners constitute a best practice in relation to technology integration.

The information provided is extremely understandable and practical in terms of understanding where one would fit within the novice-expert technology integration continuum. This article also provided suggestions on how educators could work and move towards being an expert integrator of technology. Numerous examples were provided for the reader, enabling a clear picture to be formed as to how to effectively integrate technology or to understand your technology comfort and integration level.

Article 2:

Jonassen, D. (1995). Supporting communities of learners with technology: A vision for
        integrating technology with learning in schools. *Educational Technology, 35*(4), 60-63.

David Jonassen has a clear vision towards implementing meaningful and productive technology into teaching and learning. He first emphasizes a combination of seven qualities necessary for meaningful learning to occur. The author believes that learners should be **actively** engaged by the learning process and be **intentionally** achieving cognitive objectives. **Contextualization** and **reflection** are two other key qualities, where learning should be situated within a real-world task and students should be provided the opportunity to articulate and reflect upon the learning process. The final three qualities Jonassen feels necessary for meaningful learning are: **collaboration, conversation,** and **construction**. The author refers to collaboration as learners working in learning communities, exploiting skills and observing group members' contributions. Jonassen also believes learning is social and a necessary dialogical process. Finally, learning should be constructive where students access prior knowledge to accommodate new information or ideas. As educators, Jonassen believes we can implement technology to support the previous seven learning qualities. He suggests technology as having three roles: (1) **technology as a tool** where learners can access information, represent ideas, and communicate with others, (2) **technology as an intellectual partner** where students can articulate what they know, reflect on what they learned, and construct personal meaning, and (3) **technology as a context** where

learners can represent and simulate real-world problems, represent beliefs, and support discussion within the community of learners. The author believes that technology can amplify the capabilities of humans and that we must provide these opportunities for our students by combining the seven qualities necessary for meaningful learning with the three roles that technology can play.

Obviously this is an objective article outlining David Jonassen's impressions towards engaging learners with productive and meaningful technology use, but in my opinion it makes complete sense. He provides a descriptive and thorough explanation of the seven qualities of meaningful learning, the proper roles for technology and how we can support meaningful learning with technology. Since this article is based on personal beliefs, no research or reference is suggested to support the link between meaningful learning and technology. Nonetheless, this article does provide a holistic approach to understanding how educators can integrate technology with learning to support a community of learners.

Article 3:

Thompson, M. (2003). Teaching reading and writing with great tech tools. *Media & Methods: Multimedia Products, Technologies, & Programs for K-12 School Districts, 39*(4), 8-10.

Michael Thompson is the technology coordinator at a public high school in Florida. At this high school, instructional technology is being used to increase students' motivation to read and strengthen their reading abilities. After each student is assessed, he or she is assigned a reading level, which contains books and software quiz programs. Once students read a book, they take a quiz and receive points upon mastering the concepts. Throughout the year, points are accumulated and students have the opportunity to gain recognition and win prizes. The top prize being a laptop computer! The school also incorporates programs such as WebQuest and PowerPoint to access and present information.

This article describes one success story in terms of motivating disadvantaged students to improve their reading abilities. A descriptive list of reading software programs and reading assessment programs are provided; however, the cost of the programs is not outlined. In my opinion, this strategy and program which this high school implements seems too good to be true. The organizational aspects involved seem substantial, never mind the monetary value involved. Nevertheless, it appears to be a fantastic way to reach all individual students.

Article 4:

Maddux, C. D. (1998). Barriers to successful use of information technology in education. *Computers in the Schools, 14*(3/4), 5-11.

This article addresses possible rationales as to why the Internet has not yet "made a significant, positive contribution to improving education in America" (p.5). Maddux believes it is possible to group these rationales into two main groups: (1) lack of funds and (2) attitudinal factors and using technology disadvantageously. The author feels that lack of funding is widely discussed but that educators need to concentrate on solving the attitudinal factors and improving technology use. Maddux outlines seven problems that he believes are currently causing the less-than-optimum use of the Internet in educational settings. The first problem is the **adoption of state-level plans,** which traditionally favour the urban districts and is not receptive to rapid technological changes. **Fear of pornography** is the second barrier. Maddux advocates that educators should not engage in Internet censorship but teach students acceptable and unacceptable Internet practices. When these practices are violated, students would be withdrawn from privileges. The author's next concern is the **placement of school computers**. Maddux believes all schools should have a actively running computer lab along with computers in each classroom. This will lead itself to true curriculum integration. **Failure to view technology as an educational tool** is the fourth barrier. Presently, Maddux believes that IT is viewed as the responsibility of 'the computer teacher' and that it is the responsibility of Universities and professors to teach and recognize IT within all instructional disciplines. Too much emphasis has been placed on **standardized tests** leading to teaching to the test and not to concepts or creativity. This factual or rote learning style of teaching is not conductive to the use of IT. The sixth problem Maddux addresses is the **notion that teaching is telling and learning is listening**. According to Maddux, educators need to individualize teaching and use the Internet to its potential. The final issue is the **poor quality of web pages**. Maddux believes many web pages are pedagogically and technically poor and that web pages designers should be responsible in completing pages, ensuring accurate links, and using appropriate language or grammar.

I found this article very informative in that it provides the opportunity to reflect upon other issues involved in IT other than funding. Maddux supplies excellent suggestions towards what we as educators can do to optimize the Internet use within out school community. I would definitely recommend this article to my staff, administration, and district with the hopes of overcoming many of these barriers.

Article 5:

Kearsley, G. (1998). Educational technology: A critique. *Educational Technology, 38*(2), 47-51.

This article is written in the hopes of encouraging educators to think about different approaches to incorporating technology in education. Kearsley believes that the key problem with educational technology is that "our conceptual framework is flawed in terms of how we think about technology and attempt to implement it" (p. 47). The author provides numerous examples of how and why educational technology fails, from the dilemmas of adaptive technology to the ill-prepared teachers and technology experience. Kearsley discusses the weaknesses of the 'candid' classroom model towards instructional television and the limited skills students are

being provided in order to think, solve problems, and make decisions using technology's tools. The author believes that at present, educational technology practices rarely work, that educators are incapable of fixing the previously mentioned problems due to conceptual frameworks, that a

new conceptual framework must be adopted with a more sociocultural perspective, and that for now educators should de-emphasize technology use in education.

Within this article, Kearsley paints a very bleak pictures. I found his unfavourable attitude to be exhausting and disturbing. The negatives were all discussed without any attention paid to the positive aspects of educational technology. In addition to providing the numerous reasons why educational technology fails, I would have appreciated concrete suggestions or recommendations on how we can improve these issues. However, I guess the objective of the article was to critique educational technology. With that in mind, Greg Kearsley met his purpose.

Article 6:

Goddard, M. (2002). What do we do with these computers? Reflections on technology in the classroom. *Journal of Research on Technology in Education, 35*(1), 19-26.

Goddard begins his report by listing several questions educators seek in regards to technology in the classroom, such as "how can teachers obtain, learn, and use new computer technologies?" (p. 19) and "what can teachers do to make the best possible application of technology in their classrooms?" (p. 19). The author outlines how current curriculum is based on moments of national need and what is popular at the time and believes that rapid technological advancement puts tremendous pressure on teachers to provided all students with the skills and knowledge needed to lead productive lives. Our challenge as educators "lies in our ability to decide how and what we should do to best use technology as it evolves" (p. 21). Goddard offers suggestions to this challenge in his paper. He details Roger's (1995) *Diffusion of Innovations* describing the five-stages of innovation where educators can achieve knowledge, adjust attitudes, and take action towards understanding and using new technology. The author believes that obtaining consensus in curriculum content, methodology, infrastructure, and assessment is the key to assisting educators in reaching, seeing, and using technology. Goddard also suggests numerous ways for educators to use technology from actively engaging students to communicating high expectations and providing prompt feedback. He advocates that students must actively participate in meaningful learning activities in a cooperative learning environment. Goddard concludes this paper by addressing the concept that "change may be icky" (p. 25) but believes educators must prepare students to think critically and function effectively beyond the four classroom walls and believes through the incorporation of technology educators can assist students in exploring, discovering, practicing, and appreciating the world around them.

I enjoyed this article and believe it parallels Dias and Atkinson's (2001) article *Technology Integration: Best Practices – Where Do Teachers Stand?* very nicely. Goddard concretely outlines the variety of educational technology stages a teacher could inhibit and what would be

required to move to the next advanced level. I particularly enjoyed reading the history of IT curriculum and how curriculum has been altered from the past. Finally, I believe Goddard makes a strong point in which teachers are responsible to discover the various uses of technology and that they must guide each student to comprehend ICT's vast potential and uses.

Article 7:

Miller, L., & Olson, J. (1995). How computers live in schools. *Educational Leadership, 53*(2), 74-77. Retrieved on June 8, 2003 from http://www.ascd.org/readingroom/edlead/9510/miller.html.

This article is based on research findings Miller and Olson discovered while investigating how competent, but not necessarily technologically capable, teachers use computers. The participants were 'normal' teachers and their students, and the research was conducted over an extended period, which gave teachers the opportunity to grow in their understanding and use of computers. The authors' findings were mixed and outlined the complexity of this situation. Miller and Olson discovered six issues arising from the classroom that educators should consider while incorporating IT.

1. *Does technology steer curriculum?* - It was discovered that a teacher's past practices determined technology use.
2. *What are the trade-offs in using new information technology?* – Research found some teachers exchanging a valuable hands-on real-world learning experience for computer learning.
3. *When is the computer an icon or personality?* – Many teachers gave power to the computer and considered student 'computer time' valuable.
4. *Why set it and forget it?* – The studies found teachers relying on computers to teach their students.
5. *Are teachers' views children's views?* – Each participant, from teacher to student, viewed computer software differently.
6. *What are the unintended results?* – Research found students less cooperative using the computer than when in other cooperative groups. It became the "battle for the mouse" (¶14).

Wilson and Olson later address where these issues, that educators experienced, lead. The authors believe that educators should be challenged by new ideas but that computer software should be carefully analyzed and considered before implementation. They stress that technology should assist teaching and learning not drive it.

This article was clearly written and easy to read. As a teacher who considers herself not overly technologically minded, I could relate well to this article. Wilson and Olson provided six interesting issues to consider when incorporating computers in the classroom and described some interesting and valuable ideas to use with IT based on their research.

Article 8:

Eisenberg, M. B., & Johnson, D. (2002) Learning and teaching information technology:
        Computer skills in context. (Report No. EDO-IR-2002-04). Retrieved on June 8, 2003
            from http://ericit.org/digests/EDO-IR-2002-04.shtml.

In this paper Eisenberg and Johnson state that a common understanding of computer literacy
must be established and that instead of using computers as typewriters educators must teach
students to use technology as a tool to organize, communicate, research, and problem solve.
This integrated approach should be a combined effort between classroom teacher, computer
specialist, and librarian and requires effort and planning. This approach will lead students
towards "information technology literacy" (¶7). Within this paper, Eisenberg and Johnson
provide a curriculum that incorporates both technology literacy skills with information literacy
skills. The information literacy curriculum is called "Technology Skills for Information Problem
Solving" and is based on the *Big6 Skills Approach*.

1.   ***Task Definition*** – define the problem and identify the required information
ICT example: Communicate with teachers regarding assignment, task, and information problems
using e-mail; online discussions; or real-time communications.
2.   ***Information Seeking Strategies*** – consider all information sources and develop a plan to
        search
ICT example: Assess the value of various types of electronic resources for data gathering,
including databases, CD-ROM resources, and online resources.
3.   ***Location and Access*** – locate sources and access required information within the sources
ICT example: Locate and use appropriate computer resources and technologies available within
the school library media center, including networks.
4.   ***Use of Information*** – read, view, or listen to the information and decide on relevant and
        necessary information
ICT example: Copy and paste information from an electronic source into a personal document
complete with proper citation.
5.   ***Synthesis*** – organize and communicate results
ICT example: Classify and group information using a word processor, database or spreadsheet.
6.   ***Evaluation*** – evaluate process and product
ICT example: Evaluate electronic presentations in terms of the content and format and design
self-assessment tools to help students evaluate their own work for both content and format.

I believe this curriculum definitely teaches students to organize, communicate, research, and
problem-solve. In fact, these are the exact six skills I use each time I write a final paper.
Contrary to this curriculum guides belief that it serves a range of grade levels and students, I
believe it is too complex for the average primary student. There are definitely aspects of the
curriculum that I feel primary students could handle or be challenged by if the concepts were
modified. I think this IT literacy curriculum is an excellent guide for high school teachers to
implement within any discipline.